

## The family Cerithiopsidae (Mollusca: Gastropoda) in Cuba 3. The genus *Cerithiopsis* s. l., species with brown shells

### La familia Cerithiopsidae (Mollusca: Gastropoda) en Cuba 3. El género *Cerithiopsis* s. l., especies con concha castaña

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#### ABSTRACT

Thirteen species of the genus *Cerithiopsis* s. l. found in Cuba are studied, all having brown teleoconchs. Five of them were previously known, but two of these are of doubtful validity; one was not determined due to the lack of material in good condition, and seven are described as new to science. A key to the treated species is included.

#### RESUMEN

Se estudian trece especies del género *Cerithiopsis* s. l. encontradas en Cuba y con la teloconcha de color castaño. Cinco de ellas eran ya conocidas, aunque en dos casos la identificación fue dudosa; otra quedó sin determinar por falta de material en buen estado, y siete se describen como nuevas para la ciencia. Se incluye una clave de todas las especies tratadas.

KEYWORDS: Gastropoda, Cerithiopsidae, Cuba

PALABRAS CLAVE: Gastropoda, Cerithiopsidae, Cuba

#### INTRODUCTION

The present paper is the third contribution to the study of the family Cerithiopsidae in Cuba. Some species of this family from this country were studied by the authors in previous publications, such as *Seila adamsi* (ROLÁN AND FERNANDES, 1990), *Retilaskeya bicolor* and *R. emersoni* (ROLÁN AND ESPINOSA, 1992a), and *Horologica pulchella*, *H. cubensis* and *H. rauli* (ROLÁN AND ESPINOSA, 1992b). The material studied was collected during the course of two Spanish-Cuban expeditions, and also by the

authors or by Raúl Fernández-Garcés (Cienfuegos, Cuba) in other places.

At least 60 taxa belonging to the family Cerithiopsidae from the Caribbean and nearby waters have been described by C. B. ADAMS (1839, 1850a, 1850b) (see also CLENCH AND TURNER, 1950), BARTSCH (1911, 1918), DALL AND BARTSCH (1911), HENDERSON AND BARTSCH (1914), DALL (1927), NOWELL-USTICKE (1959, 1969) and DE JONG AND COOMANS (1988), and in addition a dozen fossil species were descri-

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bed from this area by DALL (1892, 1909, 1913, 1915, 1916) and OLSSON AND HARBISON (1953). An important part of these taxa consists of species dredged in depths greater than 100 fathoms, and these are poorly represented in the studied material, which was collected in depths of 0 to 60 metres.

The knowledge of this family in the Caribbean is far from complete, and most of the species now known were described before 1927. Species described since that date, up until the revision begun by the present authors, are limited to five fossil species in OLSSON AND HARBISON (1953), two recent in NOWELL-USTICKE (1959, 1969), and two more in DE JONG AND COOMANS (1988). Most of the books or revisions of malacological fauna from several Caribbean or nearby areas (for example, WARMKE AND ABBOTT, 1961, LEAL, 1991) did not include descriptions of new species.

The European species of the family Cerithiopsidae are at present in the process of revision (Bouchet, Gofas and Warén, pers. comm.), and it is likely that important changes in the generic arrangement will be established in that work. For this reason we have preferred not to introduce new genera in our study, which is limited to a small area, and to keep the name *Cerithiopsis s. l.* wherever we find no obvious affiliation to a previously known genus.

## RESULTS

### Superfamily TRIPHOROIDEA Gray, 1847

#### Family CERITHIOPSIDAE H. and A. Adams, 1853

##### *Cerithiopsis cf. greenii* (C. B. Adams, 1839) (Fig. 1 and 50)

*Cerithium greenii* C. B. Adams, 1839. *Boston Journal of Natural History*, 2: 287-288, pl. 4, fig. 12.  
[type locality: Darmouth Harbor, Massachussets].

**Material examined:** USA (Massachusetts): lectotype MCZ n° 156202 (Fig. 50).

Northern Cuba: 1 specimen, Cayo Coco; 2 shells, 6 m, Jibacoa; 3 shells, 4 m, Comodoro Hotel, La Habana. Southern Cuba: 2 shells between 25-40 m, Cienfuegos Bay.

**Description:** See ADAMS (1839) and CLENCH AND TURNER (1950). The original description mentioned the blackish

Due to the high number of species found in this family in the studied area, we have tried to break it up into groups, in order to facilitate its study. We will therefore begin, in the present paper, with a group containing species that have a more or less uniformly brown teleoconch. Species with white or banded shells, and those that have a variable colour within the species, will be treated at a later date.

When the material studied has not indicated its pertenence, it is in the CER, from the authors collecting or from ex-CFG.

#### Abbreviations used:

AMNH: American Museum of Natural History, New York

BMNH: The Museum of Natural History, London

CER: collection E. Rolán, Vigo

CFG: collection R. Fernández-Garcés, Cienfuegos

IES: Instituto de Ecología y Sistemática, La Habana

MCZ: Museum of Comparative Zoology, Cambridge, Massachusetts

MNCN: Museo Nacional de Ciencias Naturales, Madrid

MNHN: Museum National d'Histoire Naturelle, Paris

USNM: National Museum Natural History, Washington

ZMA: Zoologisch Museum, Amsterdam

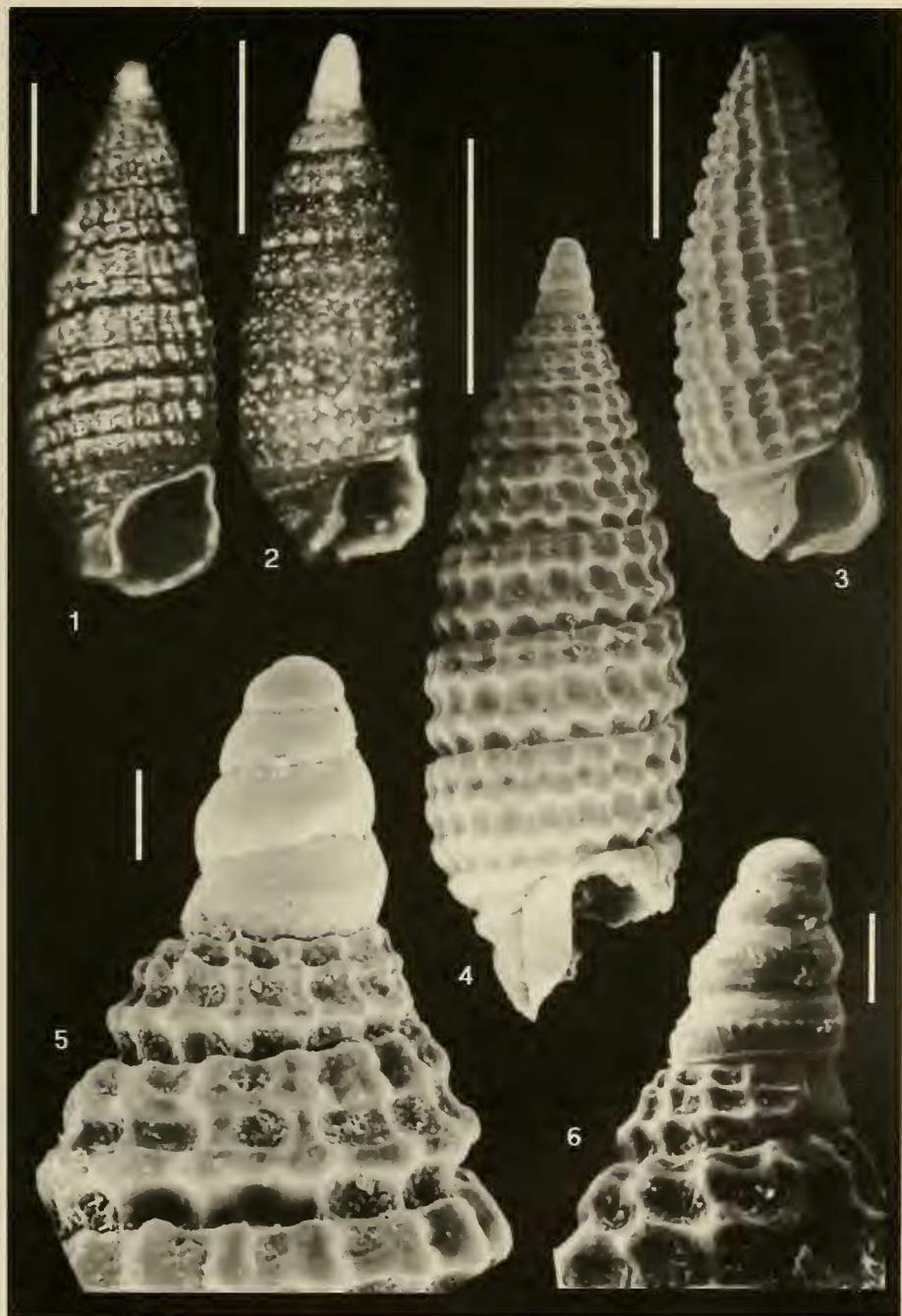


Figure 1. *Cerithiopsis cf. greenii*. La Habana. Figures 2-6. *C. fusiforme*. 2-4: Cienfuegos Bay; 5, 6: Protoconch. Scale bars, shells, 1.0 mm; protoconches, 0.1 mm.

Figura 1. *Cerithiopsis cf. greenii*. La Habana. Figuras 2-6. *C. fusiforme*. 2-4: Bahía de Cienfuegos; 5, 6: Protoconcha. Escalas, conchas 1,0 mm; protoconchas, 0,1 mm.

pearly... ", but the lectotype has its protoconch broken. The most important character for the diagnosis of this species is "... the lower series of granules rather larger, and the upper one less than the middle series; the upper series nearer to the middle one, and obsolete on the upper whorls". A smooth sutural cord is evident in the lectotype.

**Remarks:** Most shells in our material have the protoconch totally or partially broken, but the visible part of the protoconch is light brown in contrast to the dark colour of the shell. The protoconch of beach shells might be seen as being nearly white and pearly, as mentioned in the original description, although the small part of the protoconch present on the lectotype has the light brown colour of our shells.

The shells (Fig. 1) from Cuba agree with the characters mentioned in the original description but they differ slightly from the lectotype, which is lighter in color and has the lower series of nodules larger. The sculpture of Cuban shells is closer to that of the original figure, with mostly uniform nodules. Due to these differences and the distance of the type locality from Cuba, it could be that two

different species are represented. It would be necessary to compare material from the type locality and from Cuba with good protoconchs and soft parts to decide whether or not they are conspecific.

Our shells are rather similar to *C. fusiforme* (C. B. Adams, 1850) (Fig. 47), but different because its white protoconch and with the suture and upper cord of the teleoconch darker than the rest; *C. greenii* has a light brown protoconch and a uniformly dark brown teleoconch. Also, the lower row of nodules on the lectotype of *C. greenii* (Fig. 50) is not as close to the suture as the lower row on *C. fusiforme*. *C. gemmulosum* (C. B. Adams, 1850) (Fig. 49) has more numerous axial ribs and three cords with similar spaces between them. ABBOTT (1974) mentioned the possibility that *C. virginica* Henderson and Bartsch, 1914 (Fig. 48) and *C. vanhyningi* Bartsch, 1918 could be forms of this species. We disagree, because the lectotype of *C. greenii* shows the middle and upper spiral cords to be closer together on the early whorls, whereas they are more separated on *C. virginica*. These cords are fused together on several whorls of *C. vanhyningi*.

### *Cerithiopsis fusiforme* (C. B. Adams, 1850) (Figs. 2, 3, 4, 5, 6 and 47)

*Cerithium fusiforme* C. B. Adams, 1850. *Contributions to Conchology*, 7: 120-121. Figured in Clench and Turner (1950, pl. 38, fig. 4) [Type locality: Jamaica]

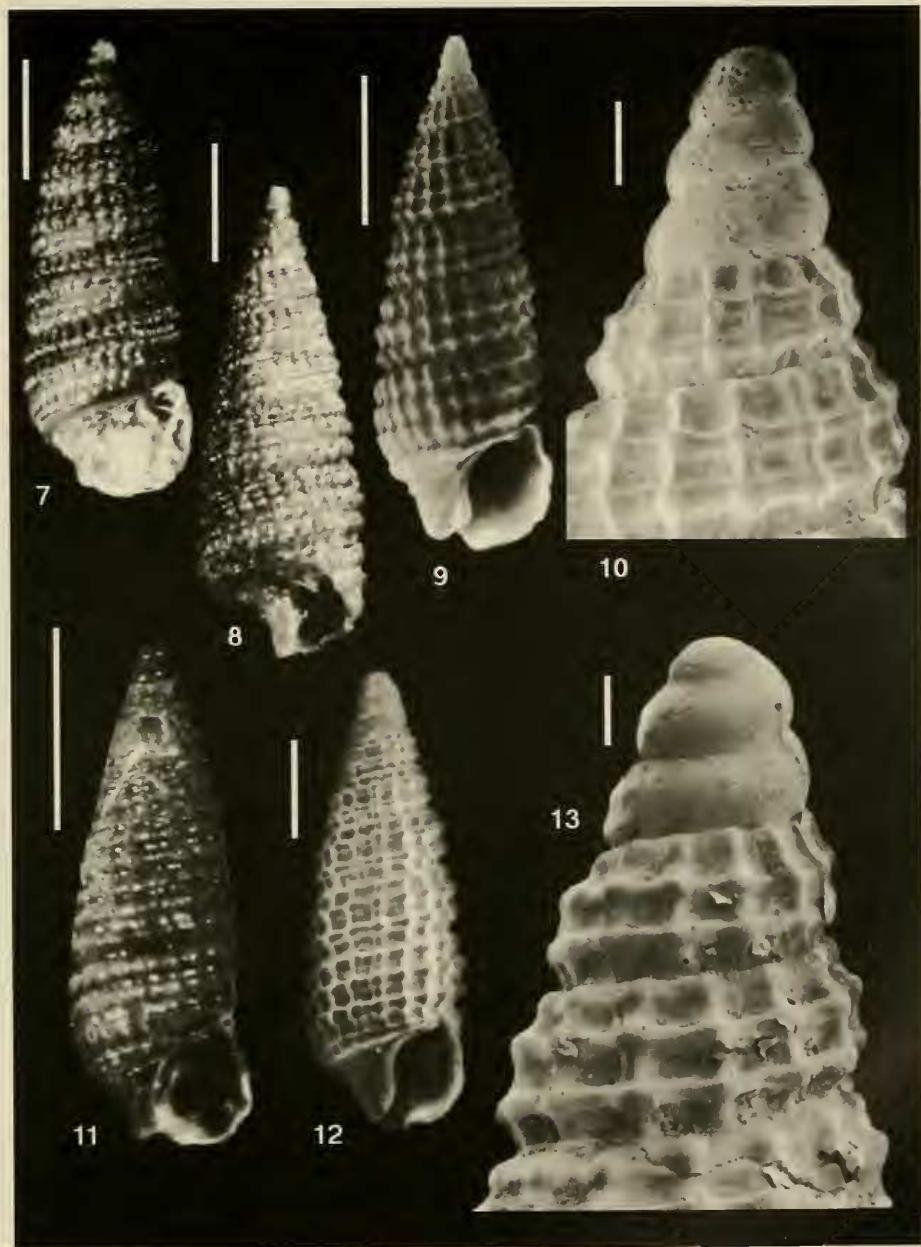
**Material examined:** Jamaica: Holotype (MCZ n° 186127) (Fig. 47).

Northern Cuba: 1 shell, 4 m, Jibacoa; 1 shell, 6 m, Baracoa, La Habana. Southern Cuba: 2 fragments, 56 m, Faro de los Colorados, 5 shells, 42 m, Punta Tamarindo (both near Cienfuegos Bay) and 3 shells, in the middle of the bay of Cienfuegos.

**Description:** See ADAMS (1850) and CLENCH AND TURNER (1950). The following characters from the original description must be mentioned: "Shell ovate-fusiform: reddish black, whitish at the apex... ...three spiral ridges, of which the upper two are nearer together and in the upper half of the shell are confluent... ...apex acute: spire with the outlines curvilinear: whorls eight or nine... ". These characters could define the species (see Figures 2, 3 and 4).

Moreover, there are three nodulous cords crossed by axial ribs at the beginning of the teleoconch, but on subsequent whorls there are only two, as the upper cords become fused. They separate on the fifth or sixth whorl, where there are once again three distinct cords.

Protoconch (Fig. 5) white, with about 4 whorls. These appear smooth, but the lowest has a slight angulation in the middle and a fine spiral cord near the base. A spiral cord may be seen at the angulation on



Figures 7-10. *Cerithiopsis gemmulosum*. 7-9: Cienfuegos Bay; 10: Protoconch. Figures 11-13. *Cerithiopsis pseudomovilla*. 11: Holotype (MNCN), Jibacoa, La Habana province; 12: Paratype (CER), Cayo Diego Pérez; 13: Protoconch, Paratype (CER). Scale bars, shells, 1.0 mm; protoconches, 0.1 mm.

Figuras 7-10. *Cerithiopsis gemmulosum*. 7-9: Bahía de Cienfuegos; 10: Protoconcha. Figuras 11-13. *Cerithiopsis pseudomovilla*. 11: Holotipo (MNCN), Jibacoa, provincia de La Habana; 12: Paratípo (CER), Cayo Diego Pérez; 13: Protoconcha, Paratípo (CER). Escalas, conchas, 1,0 mm; protoconchas, 0,1 mm.

some specimens (Fig. 6), together with some oblique lines. The shells collected in Cuba are between 2.5 and 3.2 mm.

**Remarks:** The holotype (Fig. 47) has its protoconch broken but the teleo-

conch is in good condition. The above description of the protoconch and the upper cords of the teleoconch help to distinguish *C. fusiforme* from other similar species (see remarks of *C. cf. greenii*).

### *Cerithiopsis gemmulosum* (C. B. Adams, 1850) (Figs. 7, 8, 9, 10 and 49)

*Cerithium gemmulosum* C. B. Adams, 1847. Proc. Boston Soc. Nat. Hist., 2. p. 228 (*nomen nudum*).

*Cerithium gemmulosum* C. B. Adams, 1850. Contributions to Conchology, 7: 120. Holotype figured in Clench and Turner (1950, pl. 38, fig. 13) [Type locality: Jamaica].

**Material examined:** Jamaica: Holotype MCZ n° 186075 (Fig. 49).

Northern Cuba: 1 shell, 4 m, Baracoa, La Habana. Southern Cuba: 5 shells between 25 and 50 m, off Cienfuegos Bay.

**Description:** See ADAMS (1850). The following details from the original description should be noted: "the colour... reddish black, sometimes wax-colored on the lower part of the whorls: with three spiral ridges, of which the middle one is more elevated;... whorls twelve, moderately convex". The protoconch is scarcely commented upon in the original des-

cription, which mentions only an "apex acute". Our shells (Fig. 10) have a brown protoconch of  $3\frac{1}{2}$  smooth whorls.

**Remarks:** The studied shells (Figs. 7, 8 and 9) agree well with the above description. They are smaller than the holotype (Fig. 49), but are otherwise very similar.

### *Cerithiopsis pseudomovilla* n. sp. (Figs. 11, 12 and 13)

**Material examined:** North Cuba: 6 shells, 4 m, Jibacoa; 1 shell, 2 m, Comodoro Hotel, La Habana. Southern Cuba: 1 shell, Cayo Ávalos, 3 shells, 20 m, Cayo Matías and 5 shells, 15 m, Cayo Diego Pérez, Los Canarreos Archipelago; 1 shell and 1 fragment, 15 m, Cienfuegos Bay.

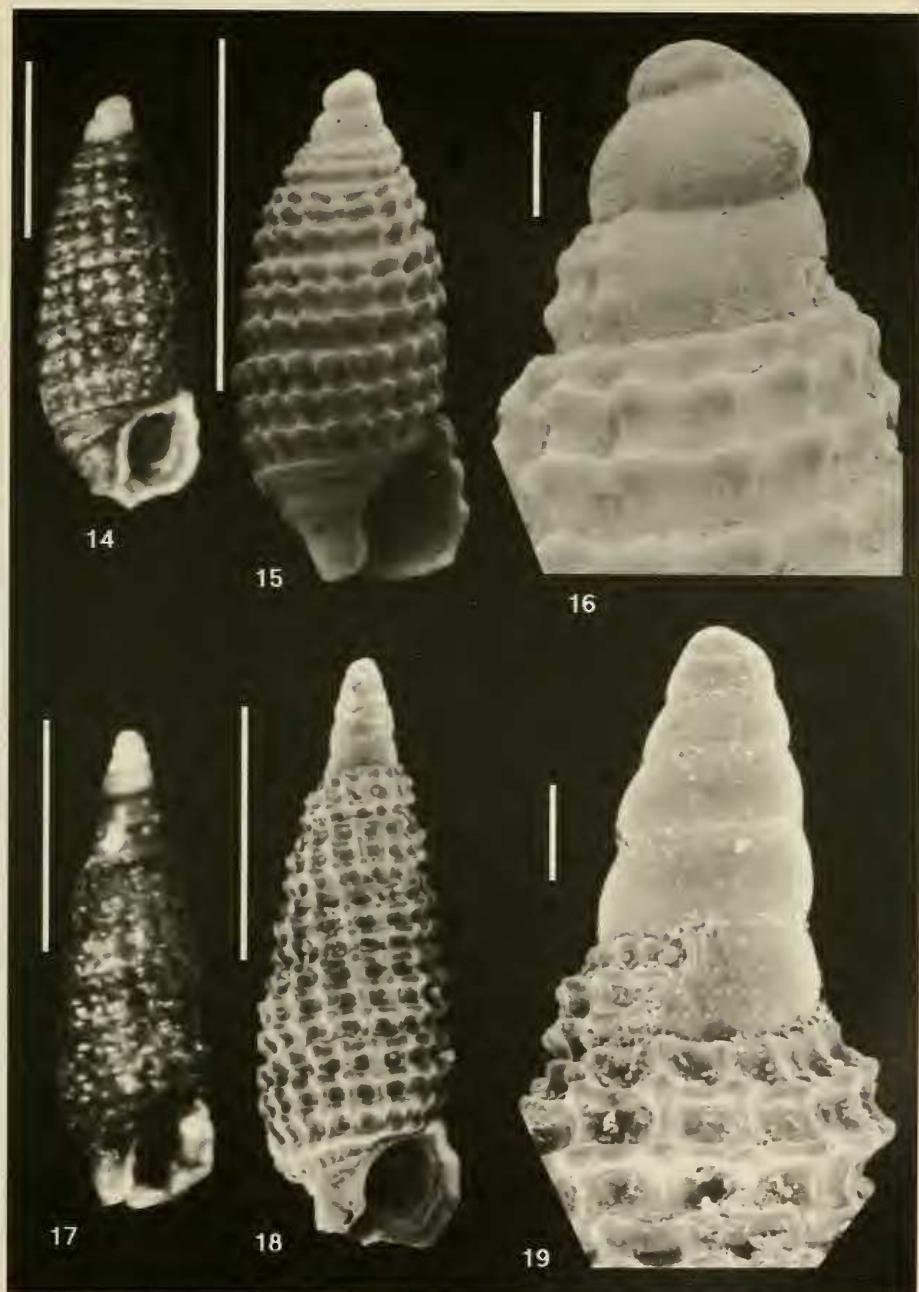
**Type material.** Holotype (Fig. 11), from Jibacoa (type locality), of 2.5 mm in MNCN (n° 15.05/17226). One paratype in AMNH (n° 226507), BMNH, CFG, IES, MNHN, USNM and ZMA; four in CER.

**Etymology:** Named after its initial resemblance to *C. movilla* Dall and Bartsch, 1911.

**Description:** Shell (Figs. 11 and 12) cylindrical ovoid, with a sharp apex. Protoconch smooth (Fig. 13), varying from just under 2 whorls to about  $2\frac{1}{4}$  whorls. The teleoconch begins with three spiral cords, the upper two of which are slightly closer together. The nodules formed at the intersection of the spiral cords and axial ribs are small, and the three rows of nodules are perfectly aligned vertically. There are between 12 and 14 axial ribs on the first whorls and rarely more than 20 on the final ones. There are four nodulous cords on the body whorl and one more towards the

base. Aperture ovoid, the siphonal canal open and short, and with very small striae on the base. The entire shell is dark brown, and measures between 1.7 and 2.6 mm (the latter size corresponding to a specimen with 8 whorls).

**Remarks:** We compared shells of *C. pseudomovilla* n. sp. to the holotype of *C. movilla* (USNM n° 221613) (Fig. 42) and found them to be very different: *C. movilla* is larger and not as dark, and the nodules at the intersection of the ribs and cords are more prominent and lighter in colour. The nodules on the



Figures 14-16. *Cerithiopsis cf. iontha*. 14, 15: Rancho Luna, Cienfuegos; 16: Protoconch. Figures 17-19. *C. dominguezi*. 17: Holotype (MNCN), Jibacoa; 18: Paratype (CER), Comodoro, La Habana; 19: Protoconch, Paratype (CER). Scale bars, shells, 1.0 mm; protoconches, 0.1 mm.

Figuras 14-16. *Cerithiopsis cf. iontha*. 14, 15: Rancho Luna, Cienfuegos; 16: Protoconcha. Figuras 17-19. *C. dominguezi*. 17: Holotipo (MNCN), Jibacoa; 18: Paratípico (CER), Comodoro, La Habana; 19: Protoconcha, Paratípico (CER). Escalas, conchas, 1,0 mm; protoconchas, 0,1 mm.

upper cord of *C. movilla* are not aligned with those on the lower two. *C. pseudomovilla* is narrower, being almost twice as narrow around the fifth and sixth whorls of the teleoconch. The axial ribs number less than 20 on the final whorls, unlike those on *C. movilla* (see DALL AND BARTSCH, 1911).

*C. iontha* Bartsch, 1911 and *C. fuscoflavus* n. sp., described later in this paper, also have paucispiral protoconchs, but they are white. *C. portoi* n. sp. has a brown paucispiral protoconch but the shell is smaller, with more numerous axial ribs on the first whorl of the teleoconch.

### *Cerithiopsis cf. iontha* Bartsch, 1911 (Figs. 14, 15 and 16)

*Cerithiopsis iontha* Bartsch, 1911. Proc. U. S. Nat. Museum, 41: 304, Pl. 28, fig. 3. Syntype in USNM n° 226451 (specimen missing) [Type locality: Bermuda].

**Material examined:** Northern Cuba: 3 shells, 4 m, Jibacoa. Southern Cuba: 7 shells, 45 m, Rancho Luna, Cienfuegos; 1 shell, 15 m, Cayo Cantiles, Los Canarreos Archipelago.

**Description:** See BARTSCH (1911). Several specimens collected in Abaco (Bahamas), with shells very similar to the Cuban material, had a totally white animal (Redfern, pers. comm.).

**Remarks:** The original description mentions two white, well rounded, smooth nuclear whorls, similar to those shown in the SEM photographs of our material (Fig. 16). The teleoconch was described as golden brown, with three spiral cords starting on the first whorl. In our shells, the beginning of the teleoconch gives the appearance of having only two spiral cords, because the upper one is smaller and close to the second. The syntype in the USNM is lost and the other types are not present in the material transferred to this institution from the Bermuda Museum. So the type

material must be considered lost. We therefore have some doubts about the relationship between our shells and the species described by Bartsch: the profile of the figured syntype in the original description of *C. iontha* (reproduced in Fig. 51) is straight, while it is slightly curved in our shells. Also, Fig. 51 shows a peripheral angle in the second whorl of the protoconch, not mentioned in the description and not present in our shells. In all other respects our shells (Figs. 14 and 15) correspond to the original description, so we prefer to use this name tentatively for our material.

The shells in our material from Northern Cuba are larger than those from the South. One of our shells has a shorter protoconch with only one whorl, but this may be an anomaly in view of the fact that the rest of the characters are similar.

### *Cerithiopsis dominguezi* n. sp. (Figs. 17, 18 and 19)

**Material examined:** Northern Cuba: 3 shells and 1 fragment, 4 m, Jibacoa; 5 shells, 2 m, Comodoro Hotel, La Habana. Southern Cuba: 2 shells, 20 m, Cayo Cantiles, 1 shell, 15 m, Cayo Ávalos and 2 shells, 10 m, Cayo Matías, all in Los Canarreos Archipelago; 1 shell, 56 m, Faro de Los Colorados, Cienfuegos.

**Type material:** Holotype (Fig. 18) from Jibacoa (type locality) of 2.00 mm, in MNCN (n° 15.05/18725). One paratype in AMNH, other in USNM and the rest in CER.

**Etymology:** Named after Manuel Domínguez, Cooperator of the AIMEN for his help with the SEM photography of the shells.

**Description:** Shell (Figs. 17 and 18) turriform, pointed. Protoconch (Fig. 19)

without any sculpture and usually with 5 whorls, the first of which are white

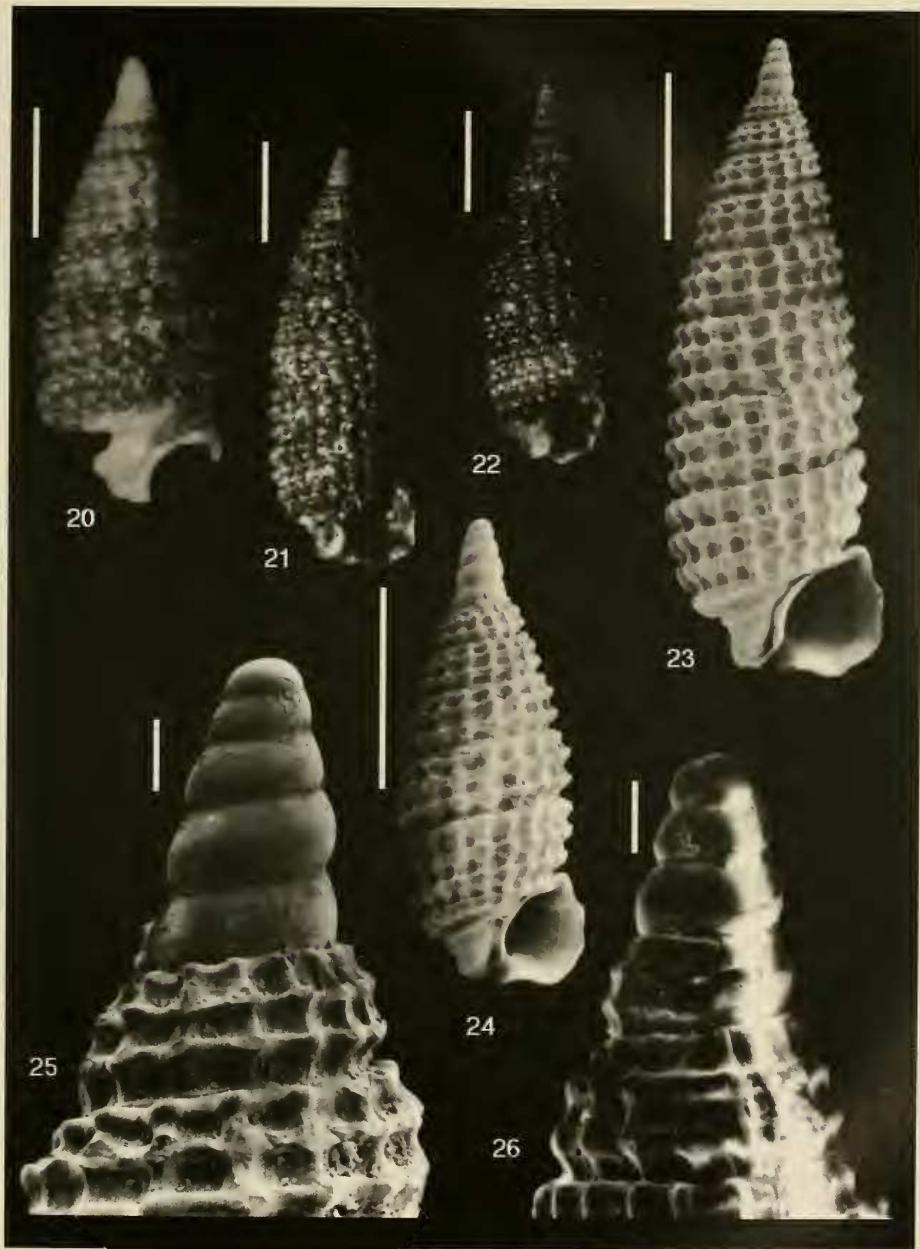


Figure 20. *Cerithiopsis vanhyningi*. Cienfuegos. Figures 21-26. *C. academicorum*. 21: Paratype (AMNH), Cienfuegos; 22: Paratype (USNM), Cienfuegos; 23: Holotype (MNCN), Cienfuegos; 24: Paratype (CER), Cienfuegos; 25, 26: Protoconch, Paratypes (CER). Scale bars, shells, 1.0 mm; protoconches, 0.1 mm.

Figura 20. *Cerithiopsis vanhyningi*. Cienfuegos. Figuras 21-26. *C. academicorum*. 21: Paratipo (AMNH), Cienfuegos; 22: Paratipo (USNM), Cienfuegos; 23: Holotipo (MNCN), Cienfuegos; 24: Paratipo (CER), Cienfuegos; 25, 26: Protoconcha, Paratipos (CER). Escalas, conchas, 1,0 mm; protoconchas, 0,1 mm.

and the remainder uniformly dark brown. Teleoconch with about 4 whorls. Three strong spiral cords of similar size are present from the beginning of the teleoconch, crossed by 14-16 axial ribs that are narrower than the intermediate spaces. At the points of intersection there are small nodules of the same colour as the rest of the shell. The upper cord is a little smaller than the other two. Suture well marked. Aperture rounded, siphonal canal short and open. The colour is brown, a little darker at the suture, on the upper cord, and at the base of the protoconch.

**Remarks:** At the beginning of this study we considered the shells of *C. dominguezi* n. sp. to be *C. cynthia* Bartsch, 1911, because they agreed with the description of that species. Later a comparison was made to the type material of *C. cynthia* (USNM n° 226449). No holotype is present in the lot sent by the USNM, which consists of only 5 very similar shells, all of which are without protoconchs (Fig. 43). It was evident that the shell and the nodules of *C. dominguezi* are smaller, lacking the row of lighter, enlarged nodules present on the upper spiral cord on the last whorls of *C. cynthia*.

DE JONG AND COOMANS (1988) were of the opinion that *C. cynthia* should be considered a junior synonym of *C. iota* (C. B. Adams, 1845). We think that the description of *C. iota* is too short and does not present enough details in order to separate it from other species. The lectotype of *C. iota* in MCZ (n° 186115), figured in CLENCH AND TURNER (1950) and examined by us, is a yellowish shell in very bad condition, lacking a protoconch and with the base eroded. *C. iota* is not conspecific with *C. cynthia* and should probably be considered *nomen dubium*.

*C. dominguezi* can be easily differentiated from the other brown species with three spiral cords at the beginning of the teleoconch: *C. academicorum* n. sp. reaches a greater length, is wider when compared with *C. dominguezi* shells of similar length, and has a brown protoconch with narrower lower whorls. *C. gemmulosum* is noticeably larger and wider and differs in colour, with more axial ribs on the last whorls of the teleoconch. *C. pseudomovilla* n. sp., *C. portoi* n. sp. and *C. movilla* have protoconchs with only 2 nuclear whorls. *C. aimen* n. sp. has the first two spiral cords closer together on the first whorls of teleoconch.

### *Cerithiopsis vanhyningi* Bartsch, 1918 (Fig. 20)

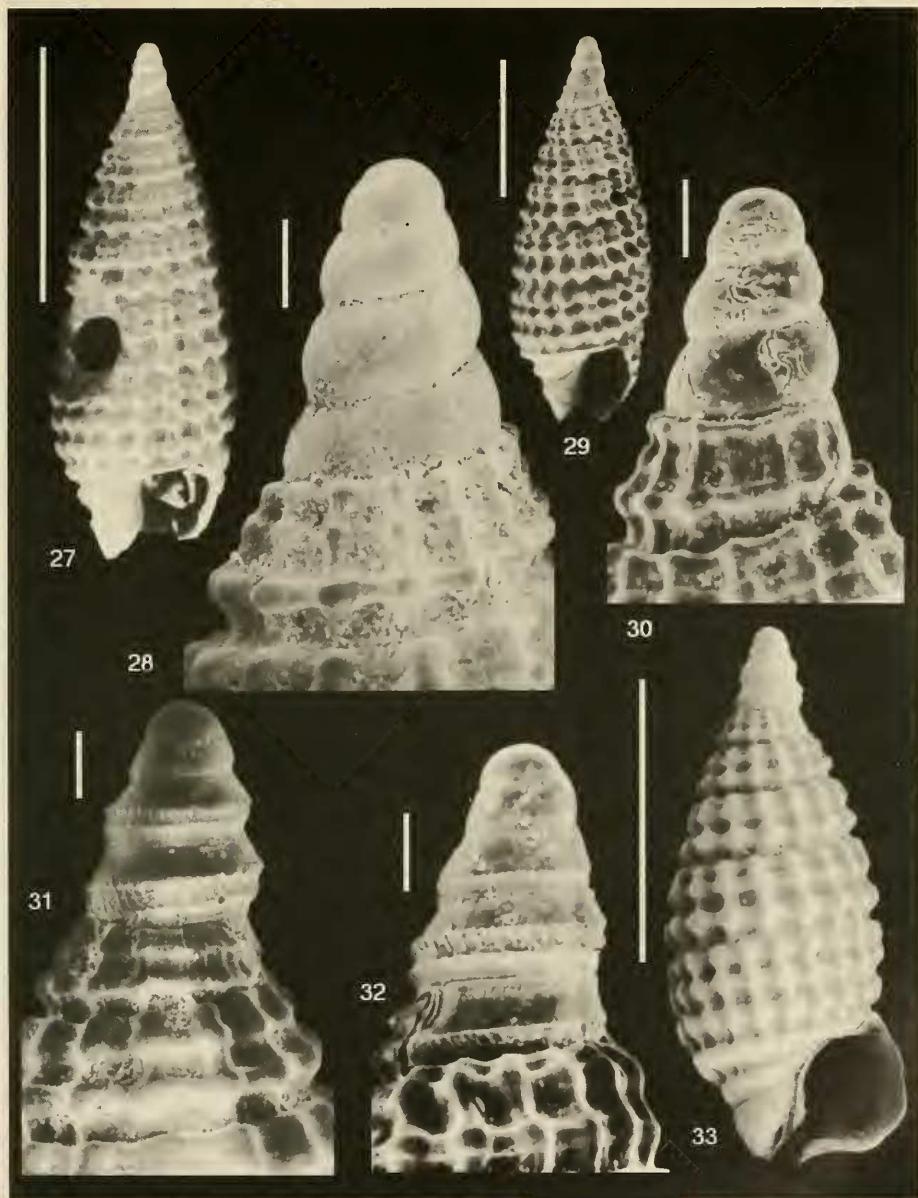
*Cerithiopsis vanhyningi* Bartsch, 1918. Proc. Biol. Soc. Wash., 31: 135 [Type locality: Tampa Bay, Florida].

**Material examined:** U.S.A. (Florida): holotype and 2 paratypes (USNM n° 219017), Tampa Bay. Northern Cuba: 1 fragment from Jibacoa. Southern Cuba: 1 broken shell, 15 m, Cienfuegos Bay.

**Description:** See BARTSCH (1918). It is important to note from the original description: "...mucronate white apex. Postnuclear whorls chestnut brown, the early ones a little lighter than the last, darkest on the base, the first marked by two slender spiral cords...".

The shells collected in Cuba are not perfect: one (Fig. 20) is broken at the base and the protoconch is not in good enough condition for SEM photography.

**Remarks:** The holotype lacks nuclear whorls, and the paratypes are in poor condition. Our shells are a little wider than the types, but otherwise similar. The protoconch appears similar to the protoconch on one of the paratypes. *C. vanhyningi* has been considered a synonym of *C. greenii* by ABBOTT (1974), but we found them to be very different. *C. greenii* has a straighter profile, with three spiral cords on the first whorls of the teleoconch. The upper two rows of no-



Figures 27-30. *Cerithiopsis aimen*. 27: Paratype (AMNH), Cienfuegos; 28: Protoconch, Paratype (AMNH); 29: Holotype (MNCN), Cienfuegos; 30: Protoconch, Holotype (MNCN). Figures 31-33. *Cerithiopsis prieguei*. 31: Protoconch, Holotype (MNCN); 32: Protoconch, Paratype (CER), Marianao Beach, La Habana; 33: Holotype (MNCN), Marianao Beach, La Habana. Scale bars, shells, 1.0 mm; protoconches, 0.1 mm.

Figuras 27-30. *Cerithiopsis aimen*. 27: Paratipo (AMNH), Cienfuegos; 28: Protoconcha, Paratipo (AMNH); 29: Holotipo (MNCN), Cienfuegos; 30: Protoconcha, Holotipo (MNCN). Figuras 31-33. *Cerithiopsis prieguei*. 31: Protoconcha, Holotipo (MNCN); 32: Protoconcha, Paratipo (CER), Playa Marianao, La Habana; 33: Holotipo (MNCN), Playa Marianao, La Habana. Escalas, conchas, 1,0 mm; protoconchas, 0,1 mm.

dules are close, but on *C. vanhyningi* they are almost fused.

Comparison of our shells to the other similar brown species with white protoconchs shows distinct differences: *C. iontha* has a paucispiral protoconch;

*C. fusiforme* has the two upper cords on the teleoconch close but separated. *C. greenii* has a more uniformly brown colour and the lower spiral cord is further from suture. *C. aimen* n. sp. has a sculptured protoconch.

### *Cerithiopsis academicorum* n. sp. (Figs. 21, 22, 23, 24, 25 and 26)

**Material examined:** Northern Cuba: 2 shells and 2 fragments, 5 m, Jibacoa; 1 shell, La Habana. Southern Cuba: 6 specimens and 12 shells, between 15 and 40 m, outside of the Cienfuegos Bay; 2 shells, 15 m, Cayo Matías, Los Canarreos Archipelago.

**Type material:** From Cienfuegos (type locality). Holotype (Fig. 23), of 4 mm in MNCN (nº 15.05/17219); 1 paratype in each of the collections of AMNH (nº 226503), BMNH, CFG, IES, MNHN, USNM, ZMA, and 7 in the CER.

**Etymology:** Named after the members who work in the Academia de Ciencias de Cuba, in La Habana.

**Description:** Shell (Figs. 21, 22, 23 and 24) turriform, pointed. Protoconch (Figs. 25 and 26) without any sculpture, uniformly brown, usually with 4  $\frac{1}{4}$  whorls but sometimes with only a little more than 3 whorls. Teleoconch with about 8 whorls which begin with three similar spiral ridges, crossed by 14-18 axial ribs on the first whorls and 20-22 on the final ones. At the points of intersection there are small nodules, and these are a little lighter than the colour of the shell. Nodules on the upper cord are slightly smaller than those on the other cords, except on the body whorl. This upper spiral cord is nearer to the middle one than the middle is to the lower. The suture is well marked. Aperture somewhat pyriform, siphonal canal short and open. Colour brown, in some shells slightly darker at the suture and on the upper spiral cord.

Some specimens were collected alive. Animal dark, ash-coloured, slightly translucent, with the eyes partly surrounded by a small area of white.

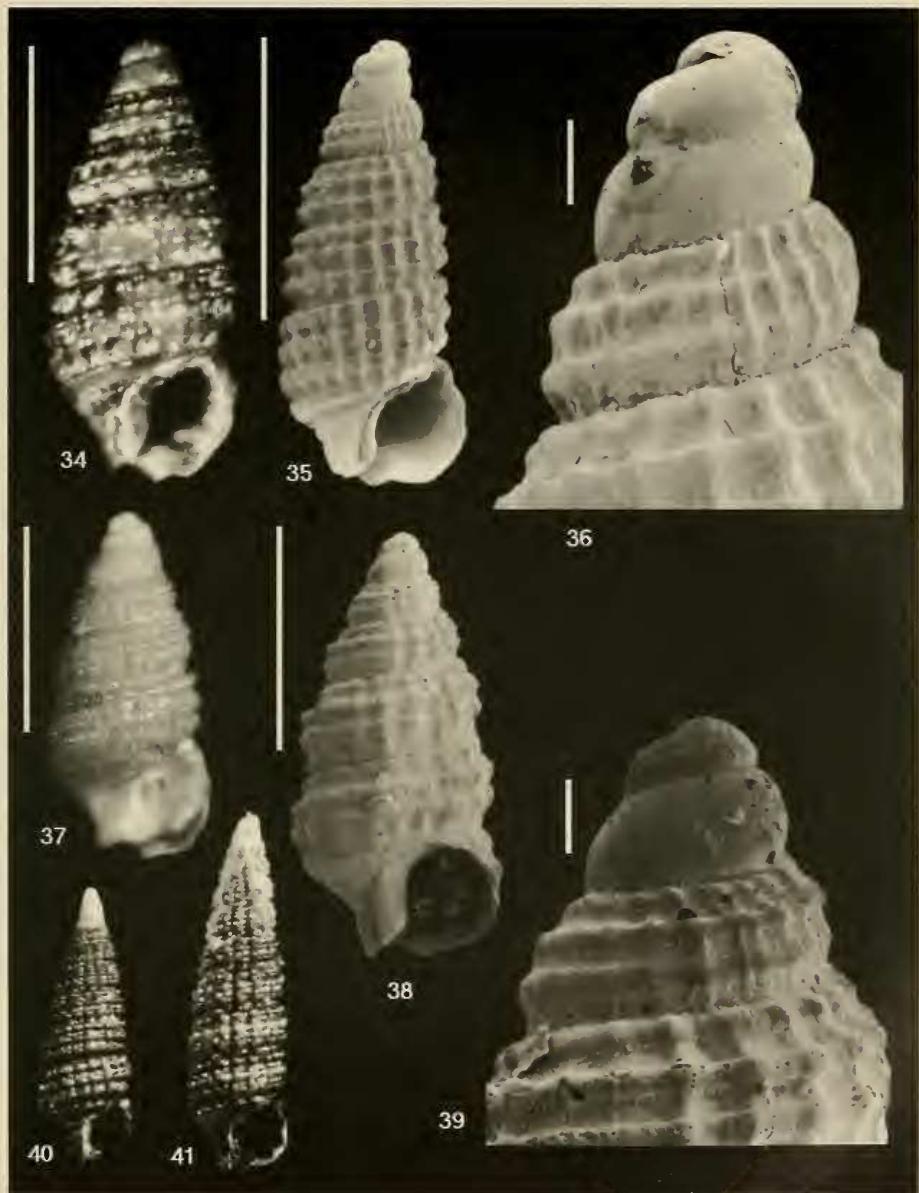
**Remarks:** Our first impression was that the present species should be included in the taxon *C. greenii*, because most of its characters corresponded to the original description and figure of that species. But after close study it was noticed that it is different from the lectotype of *C. greenii*, and some differences from the original description were

found: *C. academicorum* is smaller, rarely reaching 12 whorls including the protoconch, and never (in our material) more than 4 mm in length; colour brown, but consistently banded at the suture with darker colour that also extends to the area of the upper cord; the protoconch is consistently brown and not "nearly white and pearly"; *C. greenii* has larger nodules on the third spiral cord, which is not as close to the suture.

*C. dauba* Olsson and Harbison, 1953 also has three spiral cords from the beginning of the teleoconch, but the first two cords are closer together. *C. maisana* Olsson and Harbison, 1953 is smaller, with larger nodules.

*C. cynthia* has larger nodules at the intersecting points of ribs and cords as opposed to the very small nodules on *C. academicorum*. *C. vanhyningi* has a white protoconch, and the two upper spiral cords of the teleoconch are closer together. *C. fusiforme* also has the upper cords of the teleoconch different and has a white protoconch. *C. pseudomovilla* and *C. iontha* have paucispiral protoconchs. *C. gemmulosum* has a higher number of axial ribs on the final whorls. *C. virginica* has a white protoconch and larger nodules at the points of intersection, especially on the penultimate whorl.

Some of our shells (Fig. 26) have fewer protoconch whorls, which may be a variable characteristic of this species.



Figures 34-36. *Cerithiopsis portoi*. 34: Holotype (MNCN), Jibacoa, La Habana province; 35: Paratype (AMNH), Jibacoa, La Habana province; 36: Protoconch, Paratype (AMNH). Figures 37-39. *Cerithiopsis fuscoflavus*. 37: Holotype (MNCN), Jibacoa, La Habana province; 38: Paratype (CER), Jibacoa, La Habana province; 39: Protoconch, Holotype (MNCN). Figures 40-41. *Cerithiopsis* sp., Los Canarreos. Scale bars, shells, 1.0 mm; protoconches, 0.1 mm.

Figuras 34-36. *Cerithiopsis portoi*. 34: Holotipo (MNCN), Jibacoa, provincia de La Habana; 35: Paratipo (AMNH), Jibacoa, provincia de La Habana; 36: Protoconcha, Paratipo (AMNH). Figuras 37-39. *Cerithiopsis fuscoflavus*. 37: Holotipo (MNCN), Jibacoa, provincia de La Habana; 38: Paratipo (CER), Jibacoa, provincia de La Habana; 39: Protoconcha, Holotipo (MNCN). Figuras 40-41. *Cerithiopsis* sp., Los Canarreos. Escalas, conchas, 1,0 mm; protoconchas, 0,1 mm.

*Cerithiopsis aimen* n. sp. (Figs. 27, 28, 29 and 30)

**Material examined:** Southern Cuba: 2 shells, 42 m, Punta Tamarindo and 4 shells from sediment from the middle of the Cienfuegos Bay; 1 shell from Cayo Cantiles, Los Canarreos Archipelago.

**Type material:** Holotype (Figs. 29 and 30) from Cienfuegos Bay (type locality) of 2.5 mm in MNCN (nº 15.05/17220); 1 paratype in AMNH (nº 226504), IES and 4 in CER.

**Etymology:** The species is named after AIMEN (Asociación de Investigación Metalúrgica del Noroeste), Vigo, Spain, acknowledging the cooperation received from this institution.

**Description:** Shell (Figs. 27 and 29) oval fusiform, sharp. Protoconch (Figs. 28 and 30) smooth with 3 1/2 rounded whorls. Teleoconch with 5-6 whorls, each with three spiral cords crossed by axial ribs with nodules at the points of intersection. The two upper cords are very close but not fused. The upper and lower cords appear at same time at the beginning of the teleoconch, with the central cord subsequently forming between them (Fig. 30). The spiral cords are regularly spaced, numbering 6 on the body whorl, with the lower cord fused to the siphonal canal. Aperture rounded. Siphonal canal short and open. Protoconch white and teleoconch brown with a darker suture.

**Remarks:** The shell of *C. aimen* is very similar to that of *C. fusiforme* but is smaller, and the two can be separated by

the sculpture on the first whorl of the teleoconch. On *C. aimen* there are two spiral cords at the beginning of the teleoconch (the 1<sup>st</sup> and the 3<sup>rd</sup>), the second appearing between those in the next quarter of the whorl; on the other hand, *C. fusiforme* has three spiral cords at the beginning with a similar distance between them. Also the upper two cords are fused on the second and third whorls of the teleoconch in *C. fusiforme* and not in *C. aimen*, although they are close. *C. aralia* Olsson and Harbison, 1953 has the second and third spiral cords at the beginning of the teleoconch, with the first spiral appearing on the third whorl. *C. brassica* Olsson and Harbison, 1953 has the two cords closer at the beginning of the teleoconch. *C. virginica* Henderson and Bartsch, 1914 has the protoconch wider with fewer whorls, and the spiral cords have fewer but larger nodules.

*Cerithiopsis prieuei* n. sp. (Figs. 31, 32, 33, 44 and 45)

**Material examined:** Northern Cuba: 9 specimens and 5 shells, 2 m, Marianao Beach, La Habana; 6 shells, 5 m, Jibacoa. Southern Cuba: 1 shell, 15 m, Cayo Diego Pérez, Los Canarreos Archipelago; 8 specimens and 5 shells, 15 m, Rancho Luna; 5 shells, 42 m, Punta Tamarindo and 7 shells, 25 m, Cienfuegos Bay.

**Type material:** Marianao Beach, La Habana (type locality): Holotype (Fig. 33) of 2.2 mm, in MNCN (nº 15.05/17221); one paratype in each of the collections of AMNH (nº 226505), BMNH, CFG, IES, MNHN, UNMS, ZMA, and 4 in the CER.

**Etymology:** Named for Armando Priegue, Director of the AIMEN, for his help in our malacological research.

**Description:** Shell (Figs. 33, 44 and 45) small, fusiform, the apex sharp. Protoconch (Figs. 31 and 32) white, with four whorls. Above the suture of the second whorl are two close cords that become separated on the subsequent whorls. The two cords are noded and the upper one has small, incomplete, oblique axial ribs. There are some very small tu-

bercles in the channel below the suture. Teleoconch with 4 to 5 whorls. From the beginning there are three spiral cords crossed by axial ribs; the upper two are close, almost fused into one, and they begin to separate between the 3<sup>rd</sup> and 4<sup>th</sup> whorls. There are five cords on the body whorl, with interspaces of similar width. Aperture ovoid, with a shallow anal si-

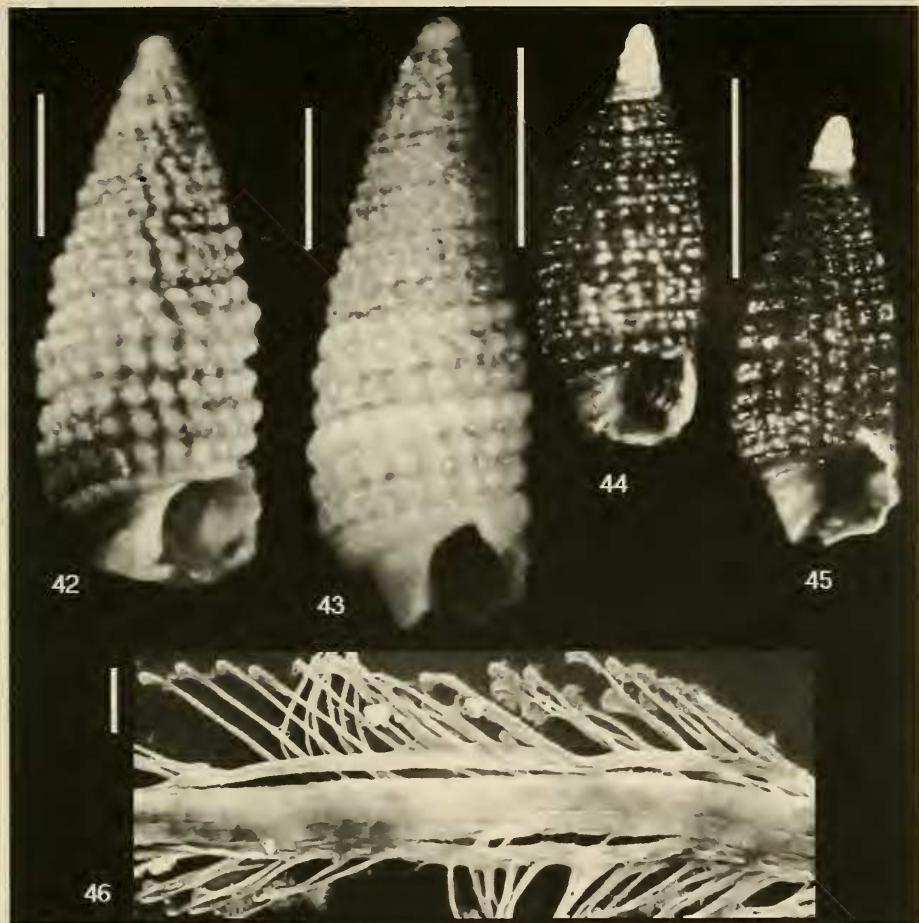


Figure 42. *Cerithiopsis movilla*. Holotype (USNM). Figure 43. *Cerithiopsis cynthia*. Paratype (USNM). Figures 44-46. *Cerithiopsis prieuei*. 44, 45: Marianao Beach, La Habana; 46: Radula. Scale bars, shells, 1.0 mm; radula, 0.01 mm.

*Figura 42.* *Cerithiopsis movilla*. Holotipo (USNM). *Figura 43.* *Cerithiopsis cynthia*. Paratipo (USNM). *Figuras 44-46.* *Cerithiopsis prieuei*. 44, 45: Playa Marianao, La Habana; 46: Rádula. Escalas, conchas, 1,0 mm; rádula, 0,01 mm.

nus and a short siphonal canal that is open and somewhat curved.

Soft parts blackish, with a white area surrounding the eyes and forming a line between them on the dorsal part of the head. Tentacles white, but frequently with a black internal line.

Some specimens had the anterior dorsal part of the foot white. Radula (Fig. 46) with very elongated marginal teeth ending in 5-6 cusps.

**Remarks:** This species is close to *C. fusiforme*, but the latter usually has a smooth protoconch; also, *C. fusiforme* has three spiral cords at the beginning of the teleoconch, while *C. prieuei* begins with two, the upper one being formed by the fusion of two, which are separated later.

*C. aimen* and *C. virginica* can be distinguished by the smooth protoconch and by the first and third cords at the beginning of the teleoconch. *C. aralia* has

the second and third spiral cords at the beginning, with the first cord appearing on the third whorl. *C. brassica* has the

two cords at the beginning of the teleoconch closer together. *C. vanhyningi* has a smooth protoconch.

### *Cerithiopsis portoi* n. sp. (Figs. 34, 35 and 36)

**Material studied:** Northern Cuba: 5 shells, 5 m, Jibacoa. Southern Cuba: 1 shell, 15 m, Cayo Cantiles, Los Canarreos Archipelago; 2 shells, 56 m, Faro de los Colorados, Cienfuegos.

**Type material:** Holotype (Fig. 35) from Jibacoa (type locality) of 1.7 mm in the MNCN (nº 15.05/17222); one paratype in each of the collections of AMNH (nº 226506), BMNH, CFG, IES and three in CER.

**Etymology:** Named for Enrique Porto of AIMEN for his help with the SEM photography.

**Description:** Shell (Figs. 34 and 35) small, fusiform, with the apex not very acute. Protoconch (Fig. 36) brown, with the first whorl sometimes lighter, and with 2 to 2 1/2 smooth and rounded whorls. Teleoconch of 4 whorls. Three spiral cords are similar in size from the beginning, the second being a little more prominent. They are separated by equal spaces and crossed by axial ribs. The axial ribs number between 16 and 20 per whorl, even on the first one. Two more spiral cords appear on the body whorl, and these are less noded. Aperture ovoid, with a shallow anal sinus and a short open siphonal canal. Columellar lip well defined. Colour brown, a little darker on the upper nodulous cord.

**Remarks:** The differences from similar small brown species with a short protoconch are: *C. pseudomovilla* and *C. movilla* are bigger, with more whorls, and initially with fewer axial ribs. *C. iontha* has a white protoconch and fewer cords at the base. *C. fuscoflavus* n. sp. is very differently coloured, with the axial ribs more attenuated. The rest of the brown species from the Caribbean have multispiral protoconchs.

### *Cerithiopsis fuscoflavus* n. sp. (Figs. 37, 38 and 39)

**Material studied:** Northern Cuba: 8 shells with protoconchs, some of them with the last whorl broken, from sediment, 5 m, Jibacoa (type locality).

**Type material:** Holotype (Fig. 37) of 1.7 mm in the MNCN (nº 15.05/18008); one paratype in the AMNH (nº 226508), IES, ZMA and 4 in CER.

**Etymology:** Named after the colour of the teleoconch.

**Description:** Shell (Figs. 37 and 38) small, ovoid elongated, with a blunt apex. Protoconch (Fig. 39) white and with a little more than one smooth rounded whorl. Teleoconch with 3 1/2 whorls. There are three spiral cords at the beginning of the teleoconch, but a small additional cord forms later near the suture. About 20 very attenuated axial ribs per whorl. Two additional less noded spiral cords appear on the body whorl. Aperture ovoid, with a shallow anal sinus and with a short and very open siphonal canal. Columellar lip not prominent. The colour is yellowish,

with the upper nodulous cord light brown.

**Remarks:** *C. fuscoflavus* n. sp. can be differentiated from other species with a short protoconch by the following characters: all others have more prominent axial ribs; *C. pseudomovilla* and *C. movilla* are dark brown, and their protoconchs have 2 whorls; *C. iontha* is bigger, is dark brown and has a white protoconch with at least 2 whorls; *C. portoi* is darker, with three spiral cords on all the whorls of the teleoconch and a protoconch of 2 whorls, and with its columellar callus strong.

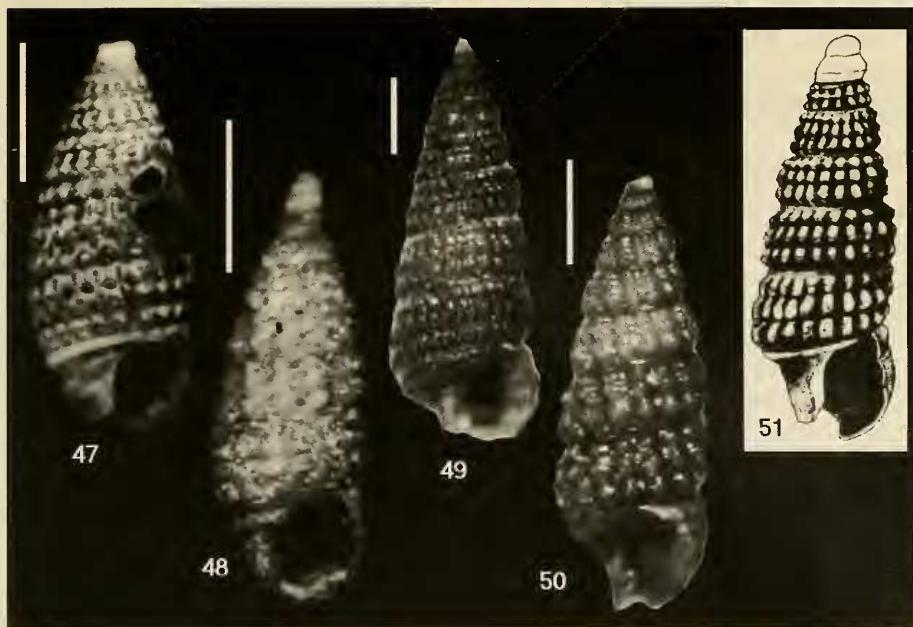


Figure 47. *Cerithiopsis fusiforme*. Holotype (MCZ). Figure 48. *Cerithiopsis virginica*. Holotype (USNM). Figure 49. *Cerithiopsis gemmulosum*. Holotype (MCZ). Figure 50. *Cerithiopsis greenii*. Lectotype (MCZ). Figure 51. *Cerithiopsis iontha*. Syntype illustrated in the original description. Scale bars 1.0 mm.

*Figura 47. Cerithiopsis fusiforme. Holotipo (MCZ). Figura 48. Cerithiopsis virginica. Holotipo (USNM). Figura 49. Cerithiopsis gemmulosum. Holotipo (MCZ). Figura 50. Cerithiopsis greenii. Lectotipo (MCZ). Figura 51. Cerithiopsis iontha. Sintipo ilustrado en la descripción original. Escalas 1,0 mm.*

### *Cerithiopsis* sp. (Figs. 40 and 41)

**Material examined:** Southern Cuba: 2 shells, 10 m, Bocas Alonso, Los Canarreos Archipelago.

**Description:** Protoconch brown with  $4\frac{1}{2}$  whorls. Teleoconch with 6 and 9 whorls on the shells studied. Two spiral cords are present at the beginning of the teleoconch, immediately followed by a third. The interspaces are of similar width. Dark brown colour with the suture a little darker. Nodules at the intersection of ribs and cords prominent and crowded, with a steely colour. The second spiral cord can be lighter.

**Remarks:** The two shells collected (Figs. 40 and 41) are imperfect, one with the protoconch eroded and the other with the aperture broken. Not enough

material was studied to permit a complete description as a new species.

*Cerithiopsis* sp. can be differentiated from *C. academicorum* by its smaller size and narrower profile, having only two spiral cords at the beginning of the teleoconch. *C. greenii* and *C. virginica* are bigger and wider, have fewer axial ribs and larger nodules. *C. fusiforme* is bigger and has the two upper cords very close together on several whorls. *C. gemmulosum* is bigger, wider and of more uniform colour, with the nodules more separated from one spiral cord to the next. *C. cynthisia* has larger nodules, the upper nodulous cord being lighter on the two final

whorls. *C. prieuei* is more ovoid, with a sculptured protoconch. *C. vanhyningi* is

wider, with a different profile, and with the first two spirals closer together.

## CONCLUSIONS

Key to the Cerithiopsidae of Cuba with brown teleoconchs:

- |   |                                |
|---|--------------------------------|
| 1 -protoconch white (at least at the apex) . . . . .  | 2                              |
| -protoconch brown . . . . .   | 8                              |
| 2 - protoconch white in the upper middle section and brown below . . . . .  | <i>C. dominguezi</i> n. sp.    |
| - protoconch wholly white . . . . .   | 3                              |
| 3 - protoconch with less than 3 whorls . . . . .  | 4                              |
| - protoconch with 3 or more whorls . . . . .  | 5                              |
| 4 - protoconch with a little more than 1 whorl. Shell yellowish . . . . .   | <i>C. fuscoflavus</i> n. sp.   |
| - protoconch with 2 whorls or a little more. Shell golden brown . . . . .   | <i>C. iontha</i>               |
| 5 - protoconch with distinct spiral sculpture . . . . .   | <i>C. prieuei</i> n. sp.       |
| - protoconch without distinct or consistent spiral sculpture . . . . .  | 6                              |
| 6 - two cords on the upper whorl of the teleoconch . . . . .  | <i>C. vanhyningi</i>           |
| - three cords on the first whorl . . . . .  | 7                              |
| 7 - two upper spiral cords visible on the first whorl of the teleoconch, fused on the next whorls and separated on the final one . . . . .  | <i>C. fusiforme</i>            |
| - the 1 <sup>st</sup> and 3 <sup>rd</sup> cords begin on the first whorl, the 2 <sup>nd</sup> appearing later. Subsequently the two upper cords are close but not fused . . . . . | <i>C. aimen</i> n. sp.         |
| 8 - protoconch with only two whorls . . . . .   | 9                              |
| - protoconch with more than three whorls . . . . .  | 10                             |
| 9 - protoconch light brown to cream; shell banded light brown . . . . .   | <i>C. portoi</i> n. sp.        |
| - protoconch and teleoconch uniformly dark brown . . . . .  | <i>C. pseudomovilla</i> n. sp. |
| 10- teleoconch with more than 28 axial ribs on the body whorl . . . . .   | <i>C. gemmulosum</i>           |
| - teleoconch with less than 23 axial ribs on the body whorl . . . . .   | 11                             |
| 11- shell slender, darker at the suture, with lighter nodules. Two cords at the beginning of the teleoconch . . . . .   | <i>Cerithiopsis</i> sp.        |
| - shell relatively wide, colour uniformly dark brown, with three cords at the beginning of the teleoconch . . . . .   | 12                             |
| 12- nodules of similar size and suture without a distinct cord . . . . .  | <i>C. academicorum</i> n. sp.  |
| - suprasutural cord with bigger nodules, and a smooth cord at the suture . . . . .  | <i>C. greenii</i>              |

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